Carbon Cycle 2.0

Pioneering science for sustainable energy solutions

Carbon Cycle 2.0 LDRD Seminar Series

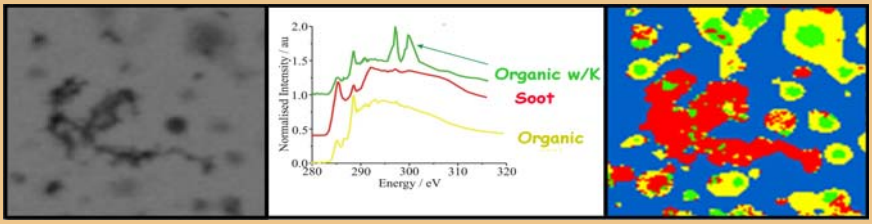
The Carbon Cycle 2.0 initiative is hosting a weekly seminar series given by recipients of Laboratory Directed Research and Development (LDRD) awards related to climate and energy. The seminars will take place most Thursdays at 2 pm in the new User Support Building large conference room (15-253) and are open to anyone interested in learning more about the wide variety of Carbon Cycle 2.0-themed research at Berkeley Lab.

Probing Atmospheric Aerosols by Micro-Spectroscopic Methods

Mary Gilles
Chemical Sciences, LBNL

WHEN: THURSDAY, MAY 19, 2011, 2PM - 3PM
WHERE: BUILDING 50 AUDITORIUM

Understanding and characterizing the diversity of particulate matter produced from fossil fuel and biomass burn combustion is important for determining the magnitude and sign of radiative forcing by aerosols. In particular improved studies on the mixing state of atmospheric particles and their evolution in the atmosphere are needed. We employ multiple single particle methods such as SEM/EDX and scanning transmission x-ray spectroscopy (STXM) with near edge x-ray absorption fine structure (NEXAFS) spectroscopy to explore the diversity of light absorbing particles. Information is presented on the percent of carbon involved in C=C double bonds (sp2 hybridization) and total atomic carbon/oxygen ratios. Light absorbing aerosols studied include numerous laboratory surrogates, spherical aged biomass burn particulates collected from laboratory burns of selected biomass fuels, and field samples collected from the MILAGRO field study in Mexico City and recent studies in California. Understanding the range of particulates formed from biomass burns and the differences compared to other light absorbing particulates is important for developing improved models of their radiative influence. For the field studies, we use time resolved aerosol collection at multiple sites to monitor changes in chemical composition as particles age and changes in mixing state. The desire to understand how atmospheric processing changes carbonaceous matter or influences water vapor uptake motivates our current efforts focused on developing in situ capabilities for the scanning transmission X-ray microscope.



Single Energy Image | Component Spectra | Spectral Component Map